Jour. Agric. Res. China (中華農業研究) 34(3) : 352~367 (1985)

Revision of the Taiwanese Species of *Alloea* Haliday (Hymenoptera: Braconidae, Alysiinae)[1]

Robert A. Wharton[2] and Liang-yih Chou[3]

Abstract: Four new species of *Alloea* (Hymenoptera: Braconidae) and a tabular summary of these species is presented. A key to the eight described species of *Alloea* is included, together with a dendrogram suggestion relationships among them.

The genus *Alloea* has been characterized primarily by the shape of the mandibles (Haliday, 1833; Wharton, 1980) and the wing venation (Fischer, 1966). In the collection of the Taiwan Agricultural Research Institute there are several individuals with typical *Alloea* mandibles, but which differ greatly in wing venation and antennal characters. Inclusion of these species in *Alloea* considerably broadens the definition of the genus, necessitating a redescription of *Alloea*. The terminology and measurements used in this paper follow Wharton (1977). Most of the type specimens are deposited in the collection of the Taiwan Agricultural Research Institute, and some of the paratypes are deposited in the Texas A&M University.

Genus **Alloea** Haliday

Type species: *Alloea contracta* Haliday, 1833; monobasic.

Head subcubical. Mandibles distinctly wider at base than at apex, with 3 distinct teeth; middle tooth very long, nearly equal in length to remainder of mandible, minutely serrate dorsally; teeth 1 and 3 greatly reduced; diagonal ridge present. First flagellomere distinctly longer than 2nd. Median flagellomeres of female expanded in some species and bearing dense tuft of short hairs ventrally; antenna equal to or slightly longer than body. Clypeus large, flat, approximately bell-shaped. Paraclypeal pits broad, extending at least half way to eye margin. Eyes bare. Malar space short to very long, with deep epistomal sulcus. Maxillary palps 5 or 6-segmented, labial palps 3 or 4-segmented. Pronotum without distinct median pit. Sternaulus extending beyond middle

1. Contribution No. **1238** from the Taiwan Agricultural Research Institute. Approved as TA 20224 by Director, Tex. Agr. Exp. Stn.

2. Department of Entomology, Texas A&M University, College Station, Texas 77843, U. S. A.

3. Department of Applied Zoology, Taiwan Agricultural Research Institute, Taichung 41301, Taiwan, The Republic of China.

of mesopleuron; crenulate. Scutellum low, rounded, never with posterior spine. Metanotum with or without tall median flange. Propodeal spiracle minute. Fore wing venation complete, at least in female; stigma variable: long, narrow, often only weakly indicated basally and poorly differentiated from metacarpus; or greatly enlarged (especially in male), hemispherical; 1st radial segment arising near middle of most distinctly thickened portion of stigma; 2nd radial segment variable; shorter than, equal to, or longer than 1st cubital cross vein; 3rd radial segment straight to weakly recurved and ending at wing tip, or curving anteriorly and ending distinctly before wing tip; brachial cell closed at distal corner by 3rd discoideal segment; 2nd discoideal segment absent or very short, parallel vein arising at or above middle of brachial cell, interstitial in several species; recurrent vein antefurcal to postfurcal; postnervellus absent; radiella and cubitella very weak; basella often nealy equal in length to 2nd mediellan segment; 1st mediellan segment longer than 2nd. Abdomen strongly dorsal-ventrally depressed in both sexes; unsculptured beyond petiole. Ovipositor short to very short, with only extreme apex extending beyond tip of abdomen; ovipositor sheath hairs clustered near tip.

Diagnosis: The mandible dominated by a long, narrow tooth 2 and greatly reduced tooth 1 and 3 distinguishes *Alloea* from all other genera of the Alysiini. The broad, flat clypeus and long malar space (at least in some species) are similar to character states found in *Syncrasis*, and suggest a close relationship between the two.

Discussion: *Alloea* previously included only 4 species. Three (*A. bonessi* Fischer, *A. contracta* Haliday, and *A. lonchopterae* Fischer) were recorded from the western Palaearctic Region and one (*A. eleophila* Wharton) from the western Nearctic Region.

A preliminary analysis of relationship among *Alloea* species is illustrated in Fig 1, based largely on the data from Table 1. The newly described species from Taiwan exhibit a numbr of features either poorly developed or totally lacking in previously described forms. However, we feel it would be premature to propose supraspecific taxa at this time because of incongruencies in the existing data and the lack of material from the eastern Palaearctic and southeast Asian Regions.

In the *Alloea* species from Taiwan, there is considerable variation in the insertion of the recurrent and parallel veins and in the size of the 2nd cubital cell. This is in marked contrast to the relatively uniform states found in other *Alloea* species (Fischer, 1966; Wharton, 1980). Although *Alloea* is usually characterized by having the recurrent vein antefurcal and the parallel vein interstitial, neither condition is found in *A. lineata*, sp. n. As in *A. lineata*, *A. sparsa*, sp. n. has the parallel vein arising from the middle of the brachial cell. Although the latter feature is generally thought to be plesiomorphic, the position of these 2 species on the dendrogram indicates that reversals may have taken place. The 2nd cubital cell is somewhat elongate in *A. striata*, sp. n. and is considerably lengthened in *A. lineata*. Previously described *Alloea* species are characterized by a broad malar space and reduced eye size. In *A. ampla*, sp. n. and *A. striata*, however, the malar space is short. Based on the dendrogram, therefore, the malar region has become secondarily shortened in the *ampla-striata-lineata* lineage. It is hoped that description of additional *Alloea* species will clarify the trends noted here, especially for the

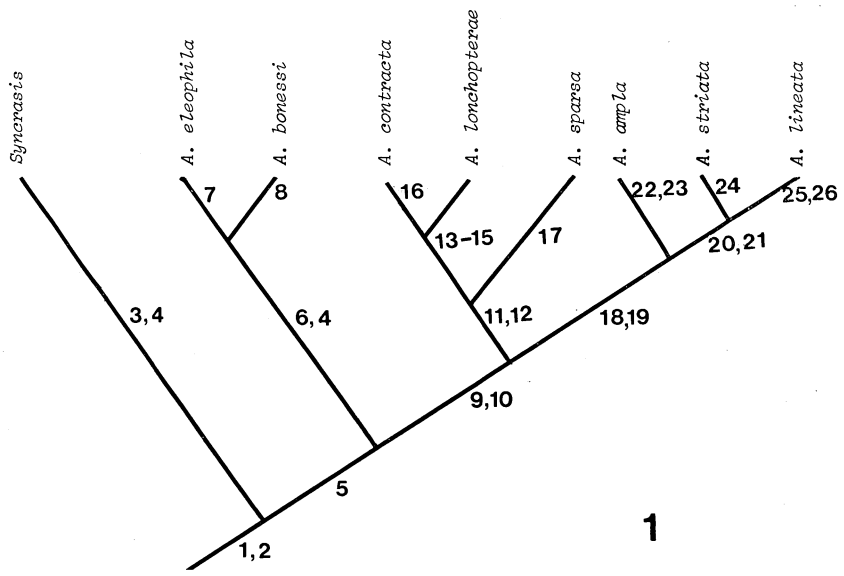


Fig. 1. Dendrogram showing relationships of *Alloea* species, based on shared, derived characteristics[4]. **1**, Bell-shaped or parabolic clypeus. **2**, Long malar space. **3**, Loss of 1st cubital segment. **4**, Reduction in number of palp segments. **5**, Mandible with elongate tooth 2. **6**, Stigma of fore wing broad, hemispherical, ending abruptly at metacarpus. **7**, Reduction in height of metanotal flange. **8**, Short 1st mediellan segment. **9**, Stigma tapering distally, merging gradually with metacarpus. **10**, Median flagellomeres expanded, at least moderately, and with brush of straight setae ventrally. **11**, r3 weakly curved. **12**, Mesonotum sparsely hairy. **13**, Mesonotal midpit extending forward as narrow groove to anterior margin of mesonotum. **14**, Mesopleuron striate dorsad of posterior end of sternaulus. **15**, Maxillary and labial palps short. **16**, Male brachypterous. **17**, Stigma nearly linear. **18**, Ventral brush of setae dense on median flagellomeres; subapical hairs lost. **19**, Reduced malar space. **20**, Loss of metanotal flange. **21**, Elongate r2 . **22**, Ovipositor elongate. **23**, Propodeal sculpture with characteristic crevice-like pattern. **24**, Loss of ventral brush on median flagellomeres with elongation of antenna. **25**, Mesonotal midpit lost or nearly so. **26**, Stigma linear.

---

4. Material examined of the non-Taiwanese species. *Alloea contracata* Haliday: 1♀, Ireland, Co. Dublin, W. of Killeen, 8. I. 1945 (A. W. Stelfox). 1♂, The Netherlands, Meyendel, nr. Den Haag, 7. VI. 1973, Univ. Leiden. *Alloea bonessi* Fischer: 2♀, Paratypes, FR4 Lonchopt, *Alloea bonessi* ♀ det. Fischer. 1 ♀, Holotype, illegible code, *Alloea bonessi* ♀ det. Fischer (There are no locality labels on these 3 specimens). *Alloea eleophila* Wharton: 1♀, 1♂, Canada, Cherryville, 5. VI. 1975 (R. Wharton); 1♀, Paratype, 7.5mi. S. E. Princeton, 6. VI. 1975 (R. Wharton) . *Alloea lonchopterae* Fischer: 2♀, The Netherlands, Wijster(Dr.), opposite Biological Station, 10-17. VI. & 4-11. X. 1974 (C. van Achterberg).

Table 1. Comparison of Taiwanese *Alloea* species with *A. lonchoperae* Fischer

Characters	*lonchopterae*	*sparsa*	*ampla*	*striata*	*lineata*
Median flagellomeres	moderately expanded	not expanded	*greatly expanded	not expanded	moderately expanded
Malar space	long 0.3–0.4x eye height	*long, 0.4–0.5x eye height	**short, 0.11–0.18x eye height	short, 0.14x eye height	moderately long, 0.20–0.29x eye height
Occiput & Mesonotal hair	sparse, hairs only along notauli	*very sparse, hairs only along notauli	sparse, lateral mesonotal lobe bare	sparse, lateral mesonotal lobe bare	dense, uniformly hairy
Metanotal flange	tall	*tall	tall	**short, weakly developed	short, weakly developed
Propodeum	completely rugose	completely rugose, with carinae	rugose posteriorly, with fossae; base smooth laterally	completely rugose	largely smooth
Stigma	moderately broad at rl	nearly linear	moderately broad at rl	moderately broad at rl	*linear
Second radial segment	short, c. 1x cupul	short, 1.04–1.13x cuqul	short, 1.10–1.25x cupul	moderately long, 1.5x cuqul	*long, 2.2–2.4x cuqul
Recurrent vein	antefurcal	interstitial or weakly antefurcal	interstitial or weakly antefurcal	interstitial or weakly antefurcal	*strongly postfurcal
Parallel vein	interstitial	not interstitial	interstitial or nearly so	*interstitial	not interstitial
Med 2/Med 1	0.5–0.6	0.8	0.6	0.9–1.0	0.6–0.7

* Interpreted as most apomorphic state
**Possible reversal to plesiomorphic condition

Taiwanese species.

Flagellomere expansion and the ventral brush of straight setae on the median flagellomeres are features which provide evidence for a link between the Taiwanese fauna and that of the western Palaearctic. In *A. contracta*, *A. lonchopterae* and *A. lineata*, the median flagellomeres are more weakly expanded than in *A. ampla*, but all 3 have at least a weakly developed ventral brush. These features, confined to the female, are not evident in other *Alloea* species, although *A. striata* may have a trace of this brush. *Alloea contracta* and *A. lonchopterae* exhibit further relationship with the Taiwanese fauna through the shape of the stigma, which is less hemispherical than in other Holarctic species, and merges gradually with the metacarpus distally. The stigma is similarly shaped, though slightly more elongate, in both *A. striata*, and *A. ampla*. Further reduction of the stigma is evident in *A. sparsa*, and a discrete stigma is largely lost in *A. lineata*.

The position of both *A. sparsa* and *A. striata* on the dendrogram is in doubt. Character states 11 and 12 are weak, and *A. sparsa* may actually have more of a sister-group relationship to the remaining species delimited by character states 9 and 10. There is greater overall similarity between *A. striata* and *A. ampla* than between *A. striata* and *A. lineata*. However, the shared sculptural, setal, and wing venation pattern responsible for this similarity are believed to be plesiomorphic. Thus, more weight has been given to character states 20 and 21.

We have been unable to separate females of *A. lonchopterae* and *A. contracta* using the material available for examination. Further study is needed to determine the status of these 2 species.

Key to *Alloea* Species

1. Brachypterous, wings not extending to tip of abdomen, veins usually thickened, males ..... *A. contracta* Haliday
- Macropterous, males and females 2
2. Stigma of fore wing broad, hemispherical to elliptical, discrete distally, ending abruptly at metacarpus (Fig. 2) 3
- Stigma linear to wedge-shaped, but always merging gradually with metacarpus distally (Figs. 10, 19, 28 & 37) 4

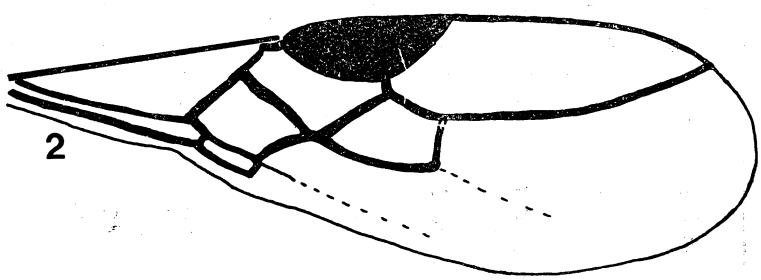


Fig. 2. Fore wing of *Alloea eleophila* Wharton, ♀.

3. Metanotum with tall median flange. Palaearctic·····*A. bonessi* Fischer
- Metanotum with low ridge. Nearctic·····*A. eleophila* Wharton
4. Recurrent vein distinctly postfurcal; 2nd cubital cell elongate, with 2nd radial segment at least twice length of 1st cubital cross-vein (Fig. 31) ···*A. lineata*, sp. n.
- Recurrent vein antefurcal to interstitial; 2nd cubital cell shorter, with 2nd radial segment at most 1.5 times longer than 1st cubital cross-vein (Figs. 10, 19 & 28) ···5
5. Malar space long, at lest 0.3 times eye height. Metanotal flange tall (Fig. 5) ·····6
- Malar space short, less than 0.2 times eye height. Metanotal flange variable·····8
6. Parallel vein arising from middle of brachial cell; stigma of fore wing nearly linear, barely perceptible (Fig. 10). Taiwan·····*A. sparsa* sp. n.
- Parallel vein interstitial or nearly so; stigma broad, elliptical. Western Palaearctic ·····7
7. Mesonotum about 1.6 times broader than apex of petiole·····*A. contracta* Haliday
- Mesonotum about 1.8 times broader than apex of petiole·····*A. lonchopterae* Fischer
8. Metanotal flange tall (Fig. 14). Median flagellomeres of female broadly expanded (Fig. 20) with dense brush of short hairs beneath····· *A. ampla* sp. n.
- Metanotal flange short, poorly developed (Fig. 23). Median flagellomeres of female neither expanded (Fig. 29) nor with dense brush of short hairs beneath····· ·····*A. striata* sp. n.

Alloea sparsa Wharton & Chou, **sp. n.**

(Figs. 3-11)

Female. Head: 1.7 times broader than long; 1.4 times broader than mesonotum. Head in dorsal view wider at eyes than at temples; eyes about 2.0-2.3 times longer than temples. Occiput very sparsely hairy above. Malar space long, 0.4-0.5 times as long as eye height. Face weakly convex; surface lightly hair-punctured; face about 1.3 times wider than high; clypeus large, nearly bell-shaped, base about twice as wide as mid-height. Mandible 1.8 times longer than apical width, 0.4 times length of head; surface weakly rugose between tooth 1 and 3, sparsely hairy at base. Antenna about 1.2 times longer than body; 24 or 25-segmented; 1st flagellomere 1.2-1.4 times longer than 2nd; middle flagellomeres not obviously expanded ventrally, segments 8-14 with sparse tuft of hairs. Maxillary palps longer than head.

Thorax: 1.5 times longer than high, 1.5 times higher than wide. Notauli present as well developed transverse sulci anteriorly, absent posteriorly. Midpit deep, moderately elongate, not extending anteriorly to middle of disc. Mesonotum sparsely hairy only along notaular lines. Prescutellar pit 4.0 times wider than long; with a midridge. Metanotum with tall flange. Propodeum completely rugose. Metapleuron rugose. Subalar area very sparsely hairy, nearly bare; remainder of disc smooth, polished, largely without hairs; posterior margin weakly crenulate, nearly smooth. Sternaulus crenulate, long, reaching middle coxa or not. Hind coxa slightly wrinkled above; hind femur about 5.6 times longer than wide.

Wing: Stigma linearly elongate, weakly broadened at 1st radial segment, barely

discrete distally, 7.8 times longer than broad; 3rd radial segment straight to weakly curved, ending just before wing tip; 2nd radial segment short, 1.7 times longer than 1st, 1.0-1.1 times longer than 1st cubital cross vein; 1st cubital cross vein straight, 2.3 times longer than 2nd cubital cross vein; recurrent vein interstitial to weakly antefurcal; nervulus postfurcal by about its own length; basal vein 1.4 times longer than 1st cubital segment; parallel vein arising from near middle of brachial cell. Fore wing about 3.1 times longer than thorax. Second segment of mediella 0.7-0.8 times as long as 1st, 2.0 times longer than basella.

Abdomen: Petiole 1.7-1.9 times longer than apical width; apex about 1.6 times wider than base; sparsely strigose. Ovipositor sheath with a dense apical tuft of hairs.

Color: Dark brown, maxillary and labial palps yellowish. Antenna and legs yellowish brown, 5th tarsi and claws darker. Wings hyaline, stigma and veins yellowish brown.

Length: Body, 1.9-2.1 mm; antenna, 2.2-2.4 mm; fore wing, 2.4-2.5 mm.

Male. Unknown.

Specimens examined: Holotype: ♀, Alishan 2400m, Chiayi, 12-16. VI. 1965 (T. Maa & K. S. Lin). Paratype: Anmashan 2275m, Taichung, 1♀, 6-9. VII. 1979 (L. Y. Chou). Additional specimens, Meifeng 2150m, Nantou, 2♂, 19-21. IV. 1983 (K. C. Chou & S. P. Huang). Tsuifeng 2300m, Nantou, 1♂, 9. V. 1984 (K. C. Chou & C. C. Pan).

Diagnosis: This species is characterized by the combination of reduced, nearly linear stigma, long malar space, short 2nd radial cell, and tall metanotal flange. It is less densely hairy on the mesonotum than other Taiwanese *Alloea* speciss.

The name of the new species refers to its sparsely hairy occiput and mesonotum. The 3 males listed above under "Specimens examined" have the mesonotum somewhat more densely hairy, with hairs scattered throughout the median lobe. They are thus included here with some hesitation.

Alloea ampla Wharton & Chou, **sp. n.**

(Figs. 12-20)

Female. Head: 1.6-1.7 times broader than long; 1.4 times broader than mesonotum. Head in dorsal view wider at eyes than at temples; eyes about 3.5-4.0 times longer than temles. Occiput sparsely hairy above. Malar space short, 0.11-0.18 times as long as eye height. Face weakly convex; granular-rugose medially, sparsely punctured laterally; face about 1.6 times wider than high; clypeus large, nearly bell-shaped, basal width about 1.6 times mid-height. Mandible 1.8 times longer than apical width, 0.4 times length of head; surface rugose, sparsely hairy at base. Antenna about 1.4 times longer than body; 28 or 29-segmented; lst flagellomere 1.5-1.7 times longer than 2nd. Flagellomeres 6-16 shorter and much broader, with dense tuft of hairs ventrally, segments 5 and 17 transitional. Maxillary palps longer than head.

Thorax: 1.5 times longer than high, 1.4-1.5 times higher than wide. Notauli present as well developed transverse sulci anteriorly, absent posteriorly. Midpit deep, elongate, extending anteriory to about middle of disc. Mesonotum densely hairy medially, lateral third bare on each side. Prescutellar pit 3.0 times wider than long; with a midridge.

Metanotum with tall flange. Propodeum rugose posteriorly, base smooth laterally; rugosities delineated by deep, convoluted fossae. Metapleuron rugose. Subalar area sparsely hairy; remainder of disc smooth, polished, without hairs; posterior margin deeply punctate throughout. Stenraulus crenulate, long, but not reaching middle coxa. Hind coxa rugulose; hind femur about 6.1 times longer than wide.

Wing: Stigma linearly elongate with weak expansion basally, 8.5 times longer than broad; 3rd radial segment straight or nearly so, ending at wing tip; 2nd radial segment short, 2.5 times longer than lst, 1.1-1.3 times longer than lst cubital cross vein; lst cubital cross vein straight, 2.0 times longer than 2nd; recurrent vein interstitial to weakly antefurcal; nervulus postfurcal by more than its length; basal vein 1.1 times longer than lst cubital segment; parallel vein interstitial or nearly so. Fore wing about 3.2 times longer than thorax. Second segment of mediella 0.5-0.6 times as long as lst, 1.3 times longer than basella.

Abdomen: Petiole 1.9-2.4 times longer than apical width; apex about 1.5 times wider than base; strigose. Ovipositor sheath with dense apical tuft of hairs.

Color: Dark brown, clypeus and mandible brown; maxillary and labial palps yellowish. antenna yellowish brown, especially basally. Wings hyaline, stigma and veins brown. Legs yellowish brown, 5th tarsi and claws darker.

Length: Body, 2.3-2.5 mm; antenna, 3.1 mm; fore wing, 2.8-3.0 mm.

Male. Antenna 33-segmented; flagellomeres 6-16 not greatly expanded; lst flagellomere 1.4-1.5 times longer than 2nd. Stigma slightly broader basally than in female.

Specimens examined: Holotype: ♀, Anmashan 2275m, Taichung, 6-9. VII. 1979 (L. Y. Chou). Allotype: ♂, Tayuling 2560m, Hualien, 12-15. IX. 1980 (K. S. Lin & C. H. Wang). Paratypes: Tungpu 1200m, Nantou, 1♂, 13-16. XII. 1982 (K. C. Chou & C. C. Pan), & 2♀, 10-14. I. 1983 (K. C. Chou & S. P. Huang). Sungkang 2100m, Nantou, 1♀, 2♂, 6. VIII. 1984 (K. S. Lin), & 1♀, 2♂, 15-17. VIII. 1984 (K. C. Chou). Meifeng 2150m, Nantou, 1♀, 10. V., & 1 ♀, 15-22. V. 1979 (K. C. Chou), 1 ♀, 1♂, 22. V. 1982 (R. Wharton), 1♀, 15. VII. 1982 (S. C. Lin & C. N. Lin), 1♀, 19-21. IV. 1983 (K. C. Chou & S. P. Huang), 15♀, 3♂, 22-26. VI. 1983 (K. S. Lin & S. C. Lin), 3♂, 30. VII. 1983 (L. Y. Chou). Tsuifeng 2300m, Nantou, 1♂, 8. V. 1981 (K. S. Lin & S. C. Lin), 2♂, 23. V. 1982 (R. Wharton), & 1♀, 15-16. VIII. 1984 (K. C. Chou). Tayuling 2560m, Hualien, 1♂, 12-15. IX. 1980 (K. S. Lin & C. H. Wang), & 1♂, 6-9. IX. 1983 (L. Y. Chou & K. C. Chou).

Diagnosis: Females are separated from all other *Alloea* by the greatly enlarged median flagellomeres with exceptionally dense brush of ventral setae. As in *A. striata*, the malar space is short and the metanotal flange is reduced. However, the propodeum of *ampla* is characteristically sculptured with deep fossae.

The name of the new species refers to its flagellomeres greatly expanded at middle.

Alloea striata Wharton & Chou, **sp. n.**

(Figs. 21-29)

Female. Head: 1.6 times broader than long; 1.4-1.5 times broader than mesonotum.

Head in dorsal view slightly wider at eyes than at temples; eyes about 2.3-3.3 times longer than temples. Occiput sparsely hairy above. Malar space short, 0.14 times as long as eye height. Face weakly convex; densely punctate medially, sparsely punctate laterally; face about 1.4 times wider than high; clypeus large, nearly bell-shaped, basal width about 1.3 times mid-height. Mandible about twice longer than apical width, 0.4 times length of head; surface weakly rugose between tooth 1 and 3, moderately hairy at base. Antenna about 1.5 times longer than body; 34 or 35-segmented; lst flagellomere 1.3 times longer than 2nd; median flagellomeres not obviously expanded, without dense tuft of hairs ventrally. Maxillary palps longer than head.

Thorax: 1.4-1.5 times longer than high, 1.5-1.6 times higher than wide. Notauli present as well developed transverse sulci anteriorly, absent posteriorly. Midpit deep, elongate, extending anteriorly to about middle of disc. Mesonotum densely hairy medially, lateral third bare on each side. Prescutellar pit 3.3 times wider than long; with a midridge. Metanotal flange short, weakly developed. Propodeum almost completely rugose, rarely smooth or nearly so mid-basally. Metapleuron smooth to weakly rugulose. Subalar area densely hairy; remainder of disc smooth, polished, without hairs; posterior margin unsculptured or nearly so. Sternaulus crenulate, long, but not reaching middle coxa. Hind coxa smooth; hind femur about 6.0 times longer than wide.

Wing: Stigma moderately distinct and expanded medially, but blending imperceptibly with metacarpus distally, 6.9 times longer than broad; 3rd radial segment strongly recurved, ending at wing tip; 2nd radial segment moderately long, 5.3 times longer than lst, 1.5 times longer than lst cubital cross vein; lst cubital cross vein straight, 1.9 times longer than 2nd; recurrent vein interstitial to weakly antefurcal; nervulus postfurcal by a distance less than its own length; basal vein 1.3 times longer than lst cubital vein; parallel vein nearly interstitial. Fore wing about 3.2 times longer than thorax. Second segment of mediella subequal to lst, 2.1 times longer than basella.

Abdomen: Petiole 2.0 times longer than apical width; apex about 1.4 times wider than base; striate. Ovipositor sheath with dense apical tuft of hairs.

Color: Dark brown, mandible lighter, maxillary and labial palps yellowish. Antenna brown, scape, pedicel, and lst flagellomere basally yellowish. Wings hyaline, stigma and veins brownish. Legs yellowish brown, claws darker.

Length: Body, 2.5-2.8 mm; antenna, 3.5-4.0 mm; fore wing, 3.1-3.3 mm.

Male. Antenna 38 or 39-segmented; lst flagellomere 1.5 times longer than 2nd.

Specimens examined: Holotype: ♀, Meifeng 2150m, Nantou, 15. VII. 1982 (S. C. Lin & C. N. Lin). Allotype: ♂, Meifeng 2150m, Nantou, 22. V. 1982 (L. Y. Chou). Paratypes: Meifeng 2150m, Nantou, 1♀, 5-9. X. 1980 (C. C. Chen & C. C. Chien), 2♂, 22. V. 1982 (R. Wharton), 1♀, 15. VII. 1982 (S. C. Lin & C. N. Lin). 4♂, 19-21. IV. 1983 (K. C. Chou & S. P. Huang), 8♀, 2♂, 22-26. VI. 1983 (K. S. Lin & S. C. Lin), 1 ♂, 30. VII. 1983 (L. Y. Chou), & 1♀, 3♂, 8-11. V. 1984 (K. C. Chou & C. C. Pan). Tsuifeng 2300m, Nantou, 1♂, V. 1984 (K. S. Lin & K. C. Chou).

Diagnosis: This species is characterized by the greatly elongate antenna, bearing at

least 5 more flagellomeres than the comparably-sized *A. ampla*. Similarly to *ampla*, *striata* has a short malar space and reduced metanotal flange. The median flagellomeres are not noticeably expanded in *A. striata*.

The name of the new species refers to its striate petiole.

Alloea lineata Wharton & Chou, **sp. n.**

(Figs. 30-38)

Female. Head: 1.3-1.4 times broader than long; 1.3-1.4 times broader than mesonotum. Head in dorsal view barely wider at eyes than at temples; eyes about twice as long as temples. Occiput somewhat densely hairy above. Malar space moderately long, 0.20-0.29 times as long as eye height. Face weakly convex; surface densely hair-punctured; face about 1.1 times wider than high; clypeus large, nearly bell-shaped, base about twice as wide as mid-height. Mandible about twice longer than apical width, 0.4 times length of head; surface smooth, sparsely hairy at base. Antenna about 1.3 times longer than body; 23-27-segmented; 1st flagellomere 1.2-1.3 times longer than 2nd; flagellomeres 9 to 12 moderately expanded, with dense tuft of hairs ventrally, segments 7 to 8 and 13 to 14 transitional. Maxillary palps longer than head.

Thorax: 1.3-1.4 times longer than high, 1.6 times higher than wide. Notauli present as well developed transverse sulci anteriorly, absent posteriorly. Midpit absent, or present posteriorly only as a very narrow, shallow crease. Mesonotum uniformly hairy, without bare patches laterally. Prescutellar pit 3.8 times wider than long; with a midridge. Metanotal flange short, weakly developed. Propodeum largely smooth with several well-defined carinae. Metapleuron rugose ventrally. Subalar area densely hairy; remainder of disc smooth, polished, without hairs; posterior margin unsculptured. Sternaulus crenulate, long, but not reaching middle coxa. Hind coxa smooth; hind femur about 6.9 times longer than wide.

Wing: Stigma greatly reduced, linear, blending imperceptibly with metacarpus, 7.5 times longer than broad; 3rd radial segment weakly recurved, nearly straight, ending at wing tip; 2nd radial segment very long, 4.0-4.5 times longer than 1st, 2.2-2.4 times longer than 1st cubital cross vein; 1st cubital cross vein straight, 1.1-1.5 times longer than 2nd; recurrent vein strongly postfurcal; nervulus barely postfurcal; basal vein 1.7 times longer than 1st cubital segment; parallel vein arising from near middle of brachial cell. Fore wing about 3.6 times longer than thorax. Second segment of mediella 0.6-0.7 times longer than 1st, 2.0 times longer than basella.

Abdomen: Petiole 1.3-1.5 times longer than apical width; apex about 1.4 times wider than base; with some longitudinal carinae. Ovipositor sheath with sparse tuft of hairs.

Color: Brown, mandible lighter, maxillary and labial palps yellowish. Antenna yellowish brown. Wings hyaline, stigma and veins brownish. Legs yellowish brown, tarsi and claws darker.

Length: Body, 1.8-2.0 mm; antenna, 2.2-2.6 mm; fore wing, 2.4-2.7 mm.

Male. Antenna 26-28-segmented; flagellomeres not expanded at middle; 1st flagello-

mere 1.4 times longer than 2nd.

Specimens examined: Holotype: ♀, Meifeng 2150m, Nantou, 5-9. X. 1980 (C. C. Chen & C. C. Chien). Allotype: ♂, collecting data same as holotype. Paratypes: Taipingshan 1950m, 1♂, 26-28. VII. 1983 (L. Y. Chou). Tungpu 1200m, Nantou, 1♂, 18-23. XI. 1981 (T. Lin & W. S. Tang), 1♀. 22-25. XI. 1982 (K. C. Chou & S. P. Huang), 4♂, 13-16. XII. 1982 (K. C. Chou & C. C. Pan), & 1♂, 10-14. I. 1933 (K. C. Chou & S. P. Huang). Meifeng 2150m, Nantou, 1♀, 5-9. X. 1980 (C. C. Chen & C. C. Chien), 1♀, 3♂, 22. V. 1982 (R. Wharton), 1♂, 31. VIII. -2. IX. 1982(L. Y. Chou & K. C. Chou), 1♂, 19-21. IV. 1983 (K. C. Chou & S. P. Huang), & 2♂, 22-26. VI. 1983 (K. S. Lin & S. C. Lin). Tsuifeng 2300m, Nantou, 1♀, 25-27. VI. 1981 (K. S. Lin & W. S. Tang), 3♂, 23. V. 1982 (L. Y. Chou), 1♂, 16. VII. 1982 (S. C. Lin & C. N. Lin), 1♂, 1-3. IX. 1982 (L. Y. Chou & K. C. Chou), 1♂, 23-25. VI. 1983 (K. S. Lin & S. C. Lin), 1♀, IV., 1♀, 3♂, V., & 1♀, 1♂, VII. 1984(K. S. Lin & K. C. Chou), 2♂, 15-16. VIII. 1984 (K. C. Chou), & 1♀, 1♂, 12-14. IX. 1984 (K. S. Lin & S. C. Lin). Tayuling 2560m, Hualien, 2♀, 2♂, 6-9. IX. 1983 (L. Y. Chou & K. C. Chou).

Diagnosis: This species is readily separated from all other described *Alloea* by the postfurcal recurrent vein and the linear stigma. In addition, the 2nd cubital cell is very elongate, and the parallel vein is not interstitial.

The name of the new species refers to its linearly elongate stigma.

Acknowledgements

We are most grateful to Dr. M. Fischer, Naturhistorishes Museum, Wien, for the loan of type material and other specimens; and to Drs. Fischer and C. van Achterberg, Rijksmuseum van Natuurlijke Historie, Lieden, for kindly allowing the senior author to examine specimens in their collection.

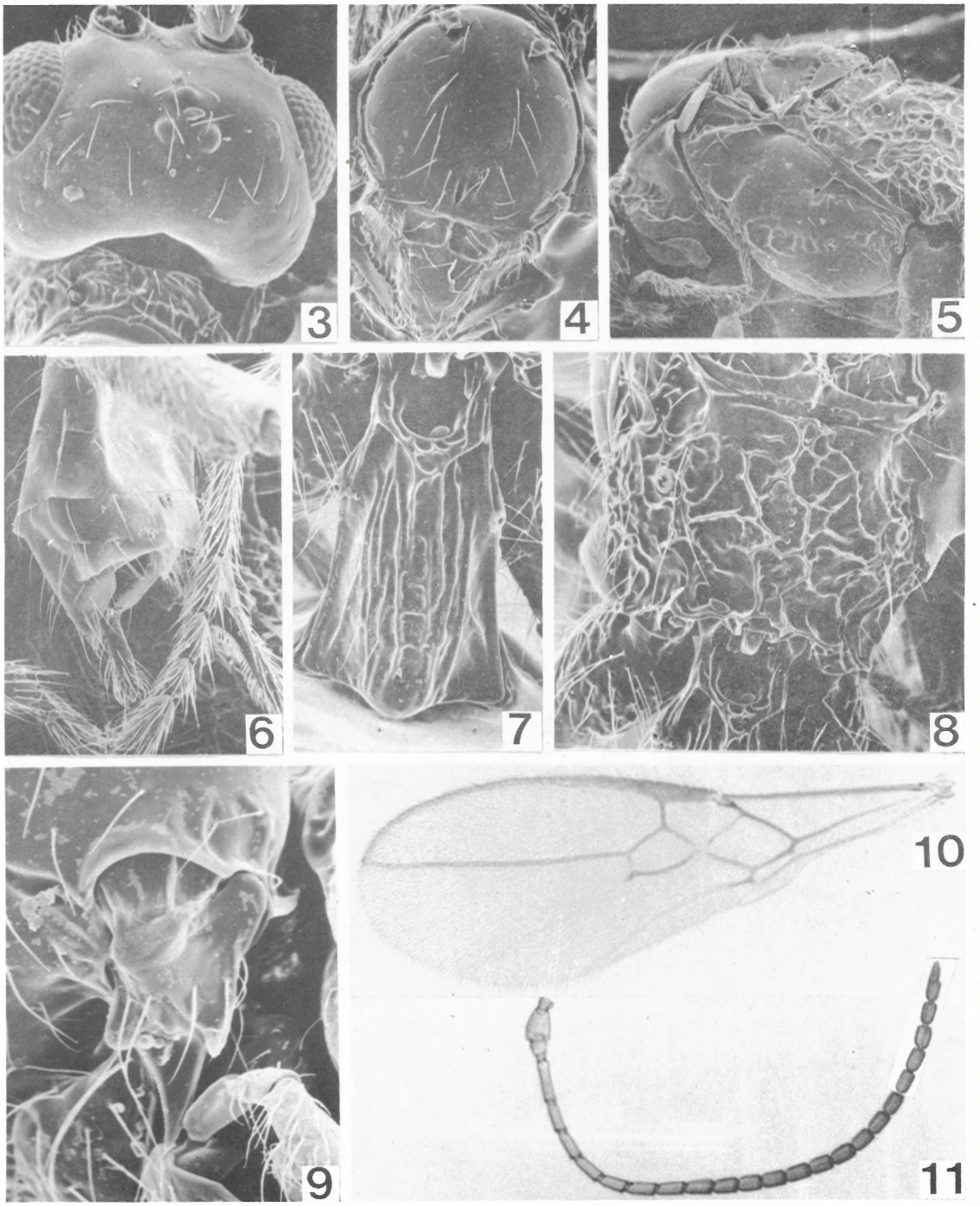
References

Fischer, M. 1966. Ueber gezuechtete Braconi den aus Europa (Hymenoptera). Z. angew Entomol., 53 : 323-339.

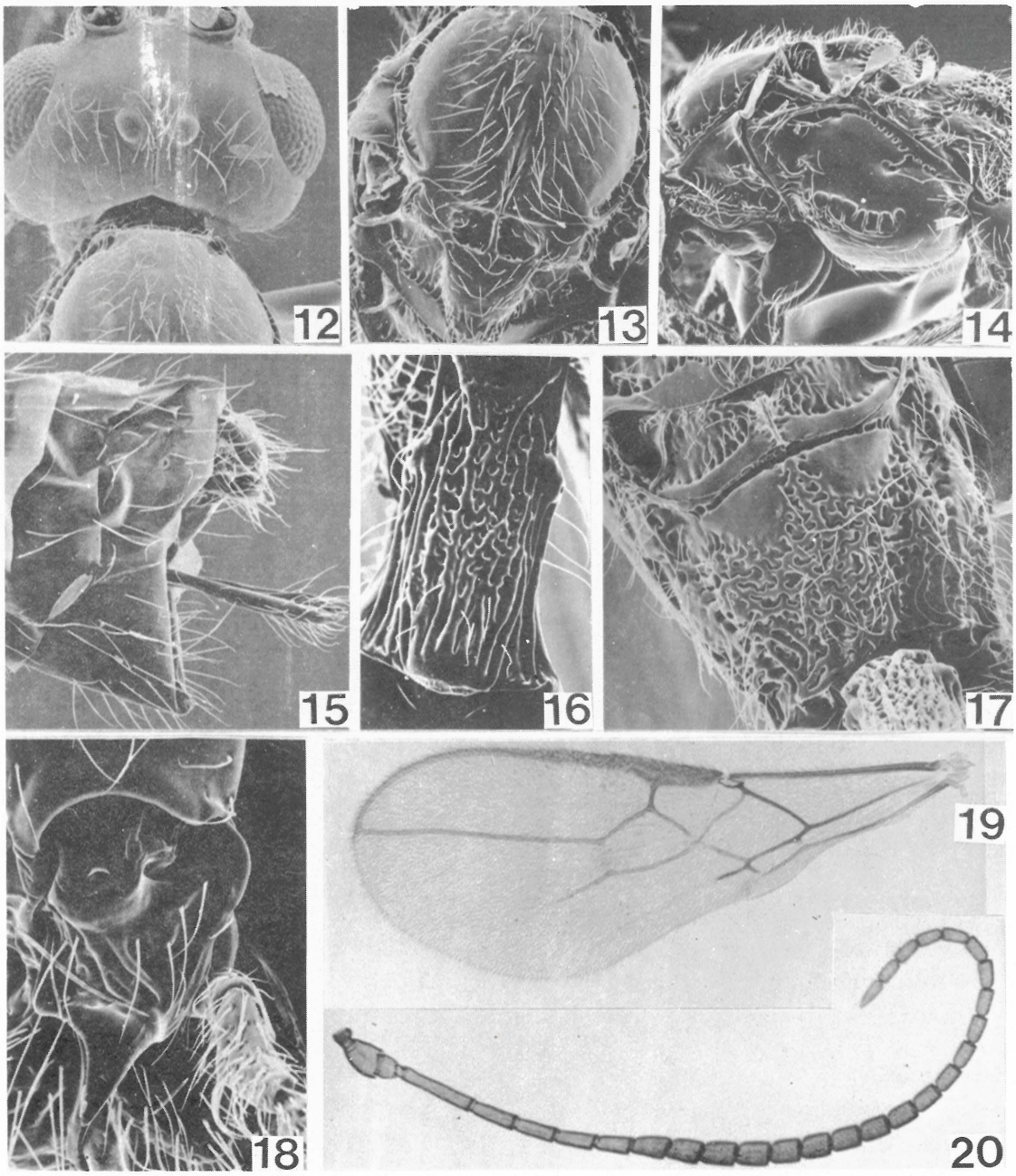
Haliday, A. H. 1833. An essay on the classification of the parasitic Hymenoptera of Britain, which correspondto the Ichneumones minuti of Linnaeus. Entomol. Mag., 1 : 259-276.

Wharton, R. A. 1977. New World *Aphaereta* species (Hymenoptera : Braconidae) with a discussion of terminology used in the tribe Alysiini. Ann. Entomol. Soc. Am., 70 : 782-803.

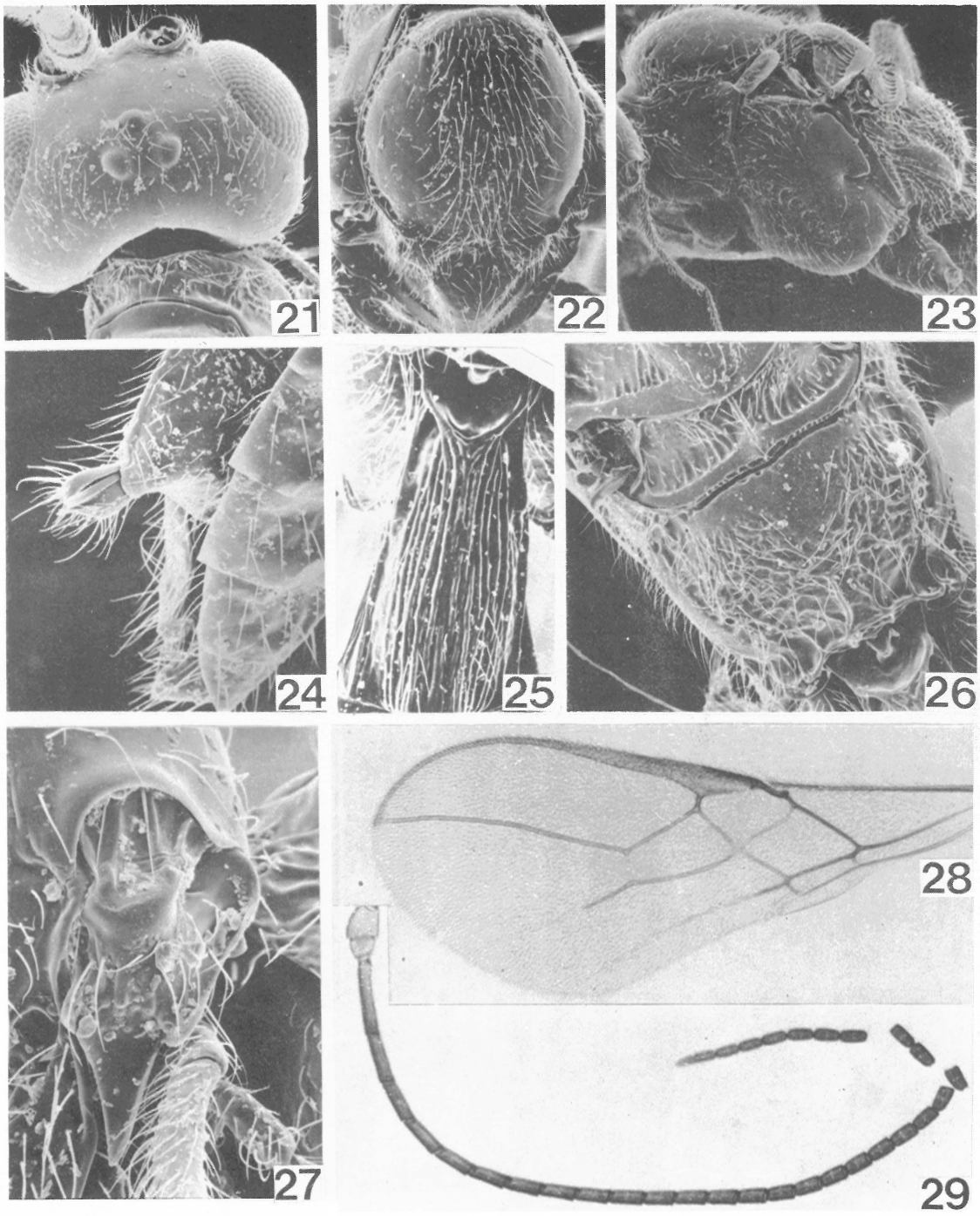
Wharton, R. A. 1980. Review of the Nearctic Alysiini (Hymenoptera : Braconidae) with discussion of generic relationships within the tribe. Univ. Calif. Publ. Entomol., 88 : 1-112.



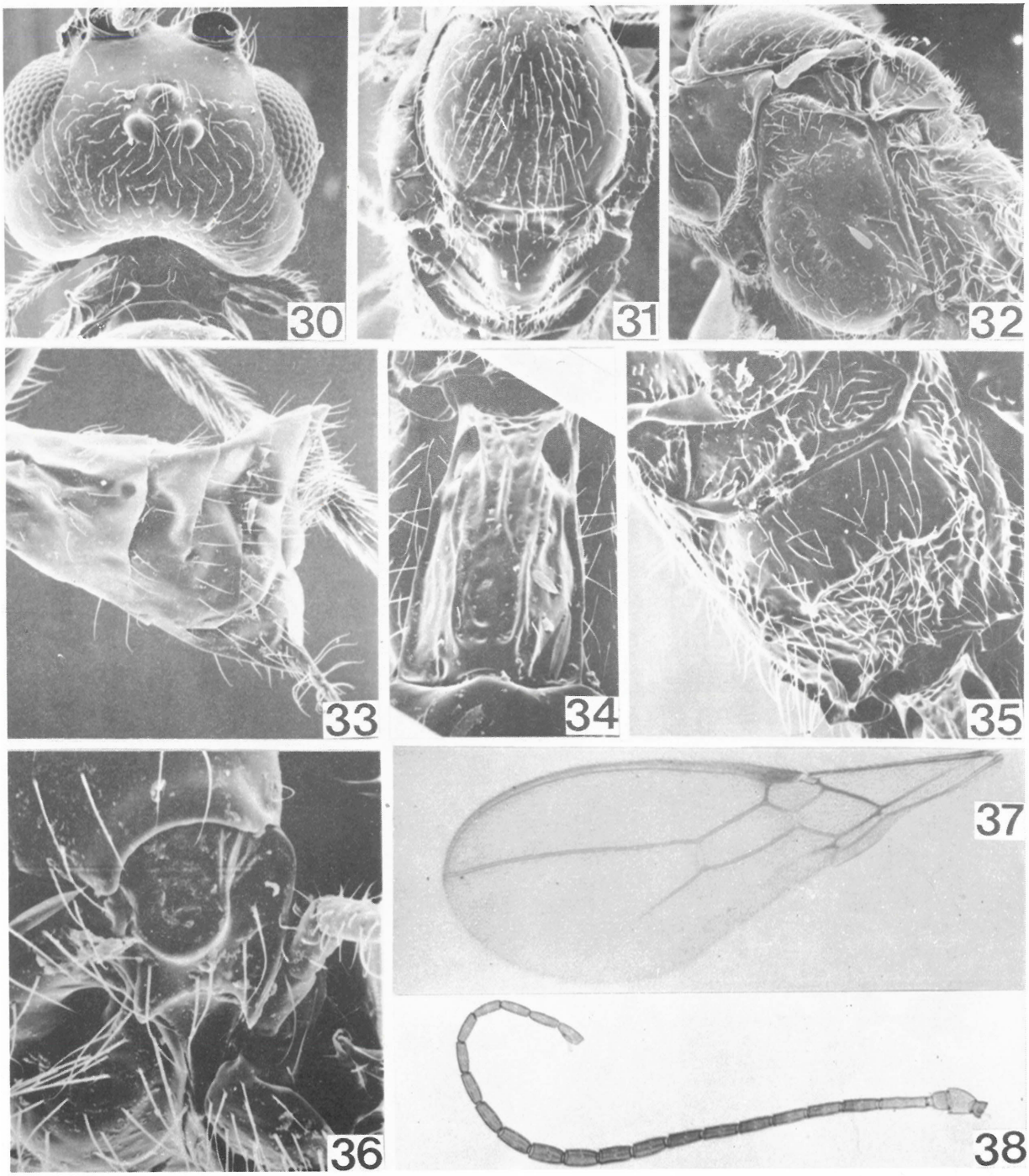
Figs. 3-11, *Alloea sparsa*, sp. n., female: 3, dorsal view of head; 4, mesonotum; 5, lateral view of thorax; 6, lateral view of apical part of abdomen; 7, dorsal view of petiole; 8, propodeum; 9, mandible; 10, fore wing; 11, antenna (Not in the same scale).



Figs. 12-20, *Alloea ampla*, sp. n., female: 12, dorsal view of head; 13, mesonotum; 14, lateral view of thorax; 15, lateral view of apical part of abdomen; 16, dorsal view of petiole; 17, propodeum; 18, mandible; 19, fore wing ; 20, antenna (Not in the same scale).



Figs. 21–29, *Alloea striata*, sp. n., female: 21, dorsal view of head; 22, mesonotum; 23, lateral view of thorax; 24, lateral view of apical part of abdomen; 25, dorsal view of petiole; 26, propodeum; 27, mandible; 28, fore wing ; 29, antenna (Not in the same scale).



Figs. 30-38, *Alloea lineata*, sp. n., female: 30, dorsal view of head; 31, mesonotum; 32, lateral view of thorax; 33, lateral view of apical part of abdomen; 34, dorsal view of petiole; 35, propodeum; 36, mandible; 37, fore wing; 38, antenna (Not in the same scale).

臺灣長齒開顎繭蜂屬之分類

(膜翅目：小繭蜂科，開顎繭蜂亞科)[1]

Robert A. Wharton[2] 周 樑 鎰[3]

摘要：本文描述臺灣產長齒開顎繭蜂屬（*Alloea*）4 新種，另外輔以圖與表加以說明比較。且以檢索表區分全世界已知 8 種之長齒開顎繭蜂屬，並以系譜圖探討其可能之相互關係。

1. 臺灣省農業試驗所 研究報告第 **1238** 號，及美國德州農業實驗站 TA 20224 號。

2. 美國德州農工大學昆蟲系。

3. 本所應用動物系助理研究員。臺灣省 臺中縣 霧峰鄉。